

MODIFICATIONS IN HUMAN FACE IMAGE FOR PERSONAL IDENTIFICATION

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ABSTRACT

A facial composite is a graphical representation of an eyewitness memory of a face, as recorded by a composite artist. Facial composites are mainly used by police in their investigation of crimes. Construction of composite is originally performed by a trained artist, through drawing, sketching, and painting in consultation with a witness or crime victim. The information about the outlines of the facial features must be given to determine the characteristics of the features because the facial features are too complicated. The information of the features is obtained manually. The actual outlines of facial features can be obtained by knowing only some key points. Marking those points is very easy because users only need to indicate a few key points in the input picture. From those key points the system can simulate the outlines of features by connecting the key points in the form of Bezier curve. The key points of new positions are also given manually and the system generates the output. The project renders a new picture using bold edges and large regions of constant shade in which the subject's distinctive features are deliberately exaggerated to produce a new effect. This project focuses on drawing human faces. Some obvious features from a person's looks can be detected as sometimes two people are determined similar to each other by observing if they have the same feature parts.

KEYWORDS: Graphical Representation, Forensic Artists, Facial Composite

INTRODUCTION

Before forensic artists can begin composing police sketches, they obviously need an idea of what their subject look like. In human perception, a person is recognized by seeing his feature parts and the outlines of his face. This project can exaggerate the feature parts and change the overall impression. For that reason eyewitness interview is the most important step in the police sketch. Officers or artists doing the questioning need to understand what to ask and how to approach interviewee to have the most accurate information. The interviewee is asked to recall as many specific details about the criminal as possible. Often participant begin by discussing hair and general face shape. During the last step, the forensic artist will ask the interviewee about any defining features. At that point, it might be helpful to jog the interviewee's memory with mug shots of previously incarcerated criminals. That way, seeing a similar nose or eyes or jaw line might spark a flashback. Forensic artist may also keep a flashback. Forensic artists may also keep a catalog of celebrity portraits around since the famous faces can spark visual clues as well. Statistic based synthesis and non-photo realistic rendering (NPR) module synthesizes exaggerative facial features and other particular characteristics such as beards or nevus [4]. The statistic-based synthesis module can exaggerate shapes and positions of facial features based on non-linear exaggerative rates determined automatically. Instead of comparing only the facial features with average face, the synthesis module proposed in this paper also considers the geometric condition of the facial features itself such as the width or length. Subsequently the NPR module generates the line drawing sketch of the original face.

MOTIVATION

A common usage of this system is in creating human faces in policing where the human features are expressed or described manually. Some obvious features from a person's looks can be detected as sometimes two people are determined similar to each other by observing if they have the same feature parts. According to the description, the changes are made in the existing human face having some obvious features and similarities. This project has the advantage in helping people who are not good at drawing. In the remainder of this paper, the method of exaggeration and system implementation is described.

SCOPE

Facial reconstruction is a method that attempts to recreate the likeness of an individual's face from the features. The scope of this system represents a scheme that uses facial feature exaggeration methods for creating human face. The facial composite created in this way is very useful in law enforcement in many ways as:

- Identifying the suspect in a wanted poster.
- Additional evidence against a suspect.
- Assisting investigation in checking leads.
- Warning vulnerable population against serial offenders.

The first step takes the digital picture of human face as input. In fetching the information of facial features, such as shape, the key points are manually marked on the input picture. Each pair of neighboring points constructs a Bezier curve. When the shape is to be changed, only key points locations are need to relocate.

In craniofacial superimposition, the overlay of either the skull and face 2D images or the skull 3D model and the face 2D image is done by bringing to match some corresponding landmarks on the skull and the face.

PROCEDURE

Input Picture

The system needs a digital picture of human face as its input file. While taking the picture, the features are more 3D if model's face is turned toward his right side about forty five degrees.

Manually Marking

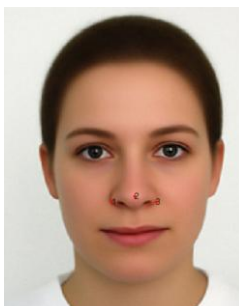
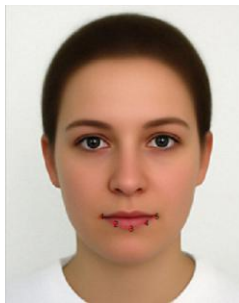
In fetching the information of facial features, such as shape, the key points are manually marked on the input picture. These facial features are separated into seven parts: the right brow, the left brow, the nose, the mouth, and the rest of the face. The outline of each part is composed of several key points. For example- take a right eye. After a user manually mark the key points of the eye, the system understands the curve of outline of the eye by connecting them in the form of Bezier curve. Each pair of neighboring points constructs a Bezier curve.

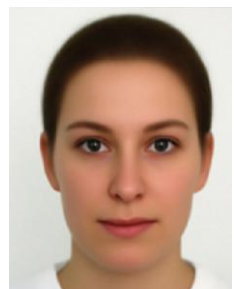
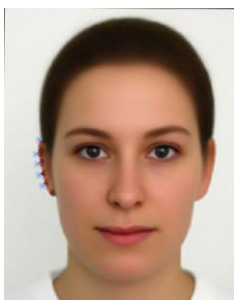
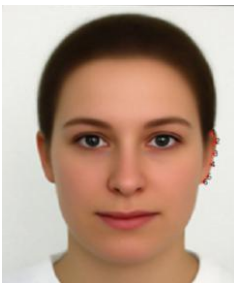
Facial Feature Drawing

Each pair of neighboring points has its own function of Bezier curve. Their result can simulate actual outlines very closely. To draw facial features, these key points are connected to each other instead of tracing along the actual outline as it is faster and easier to manipulate later. When the shape is to be changed, only key points locations are need to

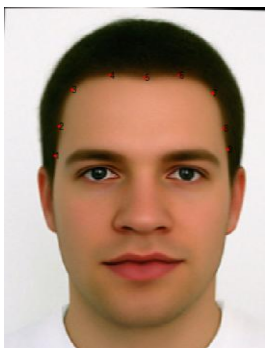
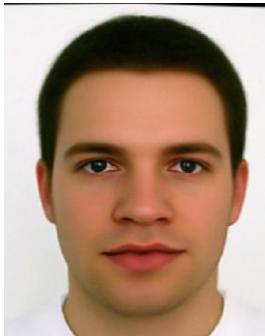
recalculate and the same functions of Bezier curve are applied. But if key points are traced along the actual outlines, every time the shape is to be changed, the whole function of Bezier curve need to be recalculated. It will take a lot time and is too complicated.

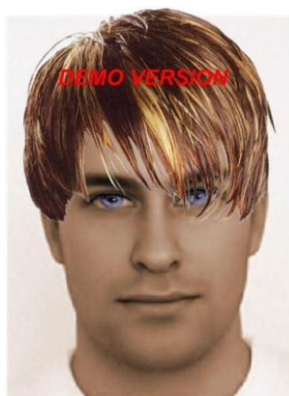
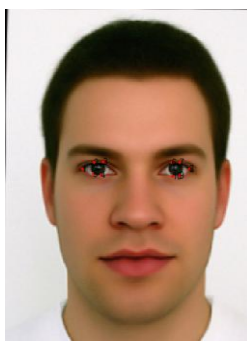
RESULTS











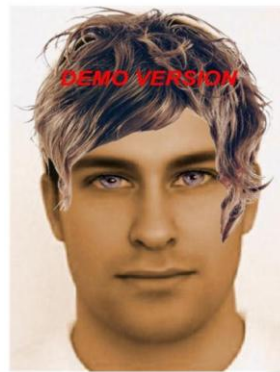


Figure 1

APPLICATION

In the first stage of craniofacial superimposition process in forensic department, when the enhancement of the face image is done in accordance with the information about the person is given, the facial feature exaggeration method is used. The matching of the landmarks in the skull and in the face is also done with the same system. Even in the plastic surgery, the shape of part after surgery is predicted by this method.

CONCLUSIONS

This system is used in creating human faces in policing where the human features are expressed or described manually. According to the description, the changes are made in the existing human face having some obvious features and similarities. The software is used to modify the extra features. This project has the advantage in helping people who are not good at drawing.

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